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SCOTTISH PAEDIATRIC AND ADULT HAEMOGLOBINOPATHIES NETWORK

Scottish Paediatric & Adult Haemoglobinopathy Network

Monitoring and management of endocrine complications in children with transfusion dependent thalassemia (TDT)

NOTE
This guideline is not intended to be construed or to serve as a standard of care. Standards of care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge and technology advance and patterns of care evolve. Adherence to guideline recommendations will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgement must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan. This judgement should only be arrived at following discussion of the options with the patient, covering the diagnostic and treatment choices available. It is advised, however, that significant departures from the national guideline or any local guidelines derived from it should be fully documented in the patient's case notes at the time the relevant decision is taken.

Monitoring and management of endocrine complications in children with transfusion dependent thalassemia (TDT)

Endocrine complications are mainly due to iron overload and are difficult to reverse. The aim should be prevention with adequate transfusion to maintain a pre-transfusion Hb>90g/l and adequate chelation therapy.

Growth and endocrine problems should be screened for regularly and managed jointly with a paediatric endocrinologist.

Growth and puberty

Delayed growth and pubertyis common in TDT with multifactorial causes including anaemia, iron overload, chelator toxicity and nutritional deficiency.

Investigation

- Short stature <3rd centile and/or declining height velocity <10th centile should be investigated
  - Consider desferrioxamine toxicity
  - Consider growth hormone deficiency
- Delayed puberty (>14y boys, >13y girls) should be investigated in conjunction with the endocrine team
- Consider measurement of bone age if there are concerns about growth or patient is starting desferrioxamine
- Consider pelvic ultrasound for uterine volume, endometrial thickness and ovarian volumes

Management

- Optimise transfusion and chelation therapy
- Optimise nutrition with dietetic referral and consider other causes e.g., coeliac
- Correct nutritional deficiencies

Bone health

Patients are at risk of a variety of bone problems including low bone mineral density (BMD) and osteoporosis, fractures and nerve compression. The causes are multifactorial including toxicity from iron chelators, endocrine dysfunction arising from iron overload, nutritional deficiencies and bone marrow expansion.

Management

- Replace vitamin D and /or calcium as per local guidelines
- Encourage patients to have an active lifestyle and a diet rich in calcium
- Optimisation of transfusion

Other endocrine complications

Patients are at risk for impaired glucose tolerance and diabetes especially if there is a positive family history

Adrenal insufficiency secondary to defects in the hypothalamic-pituitary-adrenal axis is rare but the identification of asymptomatic patients is important because this is a potentially life-threatening complication.

Monitoring

- Regular height and weight (at least 6 monthly) and assess with growth chart
- Document parental heights
- Annual assessment of pubertal development from age 10 – testicular volume, breast development, menstrual history

Investigations

All patients under 10 years,

- Bone profile3 monthly Calcium, Magnesium, Phosphate, Alkaline phosphatase
- PTH annually
- Vitamin D annually

Boys from age 10, annually

- Bone profile – Calcium, Magnesium, Phosphate, Alkaline phosphatase, PTH, Vitamin D
- Oral glucose tolerance test (fasting in morning)
- LH, FSH, testosterone, SHBG
- Thyroid function tests
- ACTH and morning cortisol
- IGF1

Girls from age 10, annually

- Bone profile – Calcium, Magnesium, Phosphate, Alkaline phosphatase, PTH, Vitamin D
- Oral Glucose Tolerance Test (fasting in morning)
- LH, FSH, oestradiol, SHBG
- Thyroid function tests
- ACTH and morning cortisol
- IGF1

DEXA scan to assess Bone Mineral Density at the end of pubertal growth.

References/ Resources

1. 2021 Guidelines for the Management of Transfusion Dependent Thalassemia (TDT) Published by Thalassemia International Federation Editors:Cappellini et al
2. Standards for the Clinical Care of Children and Adults with Thalassaemia in the UK, 3rd Edition (2016)
3. Delayed puberty - Symptoms, diagnosis and treatment | BMJ Best Practice